

WHAT IS CLAIMED IS:

1. A line clocking arrangement used in a scanner for synchronizing the line readout of a clocked imaging device with the motion of an object being scanned; said imaging device including a photosensitive area, an overflow drain, at least one horizontal output register, a drain gate interposed between the photosensitive area and the overflow drain, and one or more transfer gates interposed between the photosensitive area and the horizontal output register for transferring charge between the photosensitive area and the horizontal output register; said arrangement comprising:

an encoder for sensing movement of the object being scanned and generating a sync signal in correspondence with a movement of the object; and

a timing generation circuit for generating clock signals for controlling the clocked imaging device, said clock signals including a drain clock signal for controlling the dumping of charge into the overflow drain and an output clock signal for clocking image charge through the horizontal output register, wherein the timing generation circuit receives the sync signal and times the duration of the drain clock signal and the beginning of the output clock signal to the occurrence of the sync signal, whereby the line readout time is dynamically adjusted to changes in velocity of the scanned object during a period when charge is being dumped into the overflow drain.

2. The arrangement as claimed in claim 1 wherein the beginning of the output clock signal is delayed to accommodate a slower velocity in the movement of the scanned object.

3. The arrangement as claimed in claim 1 wherein the duration of the drain clock signal is extended to accommodate a slower velocity in the movement of the scanned object.

4. The arrangement as claimed in claim 1 wherein the object to be scanned is a photographic film.

5. The arrangement as claimed in claim 1 wherein the clocked imaging device is a tri-linear CCD imaging device.

6. A line clocking arrangement used in a scanner for synchronizing the line readout of a clocked imaging device with the motion of an object being scanned; said imaging device including a photosensitive area, an overflow drain, at least one horizontal output register, an accumulation region arranged adjacent the photosensitive area to accumulate charge before transfer to either the overflow drain or the output register, a drain gate interposed between the accumulation region and the overflow drain, and one or more transfer gates interposed between the accumulation region and the horizontal output register for transferring charge between the accumulation region and the horizontal output register; said arrangement comprising:

an encoder for sensing movement of the object being scanned and generating a sync signal in correspondence with a movement of the object; and

a timing generation circuit for generating clock signals for controlling the clocked imaging device, said clock signals including a drain clock signal for controlling the dumping of charge from the accumulation region into the overflow drain and an output clock signal for clocking image charge through the horizontal output register, wherein the timing generation circuit receives the sync signal and times the duration of the drain clock signal and the beginning of the output clock signal to the occurrence of the sync signal, whereby the line readout time is dynamically adjusted to changes in velocity of the scanned object during a period when charge is being dumped into the overflow drain.

7. The arrangement as claimed in claim 6 wherein the beginning of the output clock signal is delayed to accommodate a slower velocity in the movement of the scanned object.

8. The arrangement as claimed in claim 6 wherein the duration of the drain clock signal is extended to accommodate a slower velocity in the movement of the scanned object.

9. The arrangement as claimed in claim 6 wherein the object to be scanned is a photographic film.

10. The arrangement as claimed in claim 6 wherein the clocked imaging device is a tri-linear CCD imaging device.

11. A method for synchronizing the line readout of a clocked imaging device with the motion of an object being scanned; said imaging device including a photosensitive area, an overflow drain, a horizontal output register, and a drain gate; said method comprising the steps of:

sensing movement of the object being scanned and generating a sync signal in correspondence with a movement of the object; and

generating a drain clock signal for controlling the dumping of charge into the overflow drain;

generating an output clock signal for clocking image charge through the horizontal output register; and

timing the duration of the drain clock signal and the beginning of the output clock signal to the occurrence of the sync signal, whereby the line readout time is dynamically adjusted to changes in velocity of the scanned object during a period when charge is being dumped into the overflow drain.

12. The method as claimed in claim 11 wherein the beginning of the output clock signal is delayed to accommodate a slower velocity in the movement of the scanned object.

13. The method as claimed in claim 11 wherein the duration of the drain clock signal is extended to accommodate a slower velocity in the movement of the scanned object.